rich forests of the beech, *Fagus Cunninghamii*, and of the various species of *Eucalyptus*.

With the above it is interesting to compare the impressions of a visitor, as given by SAUNDERS[9] reporting the tour of the British Association in Australia. More detailed studies of limited areas are those of OSBORN and HARDY,[10] the latter giving an interesting account of a scrub vegetation termed "mallee," as it occurs in a portion of Victoria with 12–20 in. annual precipitation. This seems to be a semi-desert association of woody plants growing 6–10 ft. high, at times forming a rather open stand, but often almost impenetrable thickets. Shrubby species of *Eucalyptus* with vegetative habits of reproduction predominate with the almost leafless "broom mallee," *Exocarpus spartium*, upon sandy ridges.

OSBORN[11] describes the climatic conditions of the region about Adelaide which possesses a winter rainfall, 70 per cent of the total annual precipitation being between the months of May and October. Evidences remain that the plains upon which the city of Adelaide now stands were originally well wooded with various species of *Eucalyptus*, while the low sandy flats separating the plains from the sea show associations of the mangrove, *Avicennia officinalis*, and of shrubby species of *Salicornia*. Portions of the coast have in addition low sand dunes with grasses and shrubs. Notes upon other associations of the plains and mountains are also given, while not the least interesting is the brief study of the remarkable similarity of leaf forms existing in widely separated families, notably the sickle-shaped leaves of certain species of *Eucalyptus* and *Acacia*.—GEO. D. FULLER.

**Meiotic divisions.**—Owing to views put forward by LAWSON[12] as the result of an investigation of *Smilacina*, Miss WOOLERY[13] has investigated similar stages in a species of the same genus, and her conclusions do not agree in the main with those of LAWSON.

In the resting nucleus, the chromatin granules are found to be held in the meshes of a so-called fine linin network. This network, though perhaps not so extensive as it appears, is not altogether a fanciful structure. At no time in the early prophases was the individuality of the chromosomes apparent,

[9] SAUNDERS, E. R., The Australian meeting of the British Association. I. Botanical excursions. New Phytol. **14**:50–62. 1915.

[10] HARDY, A. D., The mallee: Ouyen to Pinnaroo. Victorian Nat. **30**:148–167. 1914.

[11] OSBORN, T. G. B., Notes on the flora around Adelaide, South Australia. New Phytol. **13**:109–121. 1914.

[12] LAWSON, A. ANSTRUTHER, The phase of the nucleus known as synapsis. Trans. Roy. Soc. Edinburgh **47**:591–604. 1911.

[13] WOOLERY, RUTH, Meiotic divisions in the microspore mother cells of *Smilacina racemosa* (L.) Desf. Ann. Botany **29**:471–482. 1915.

though this seems to be due partly to a misunderstanding of the term "maintenance of the individuality of chromosomes." The single spireme, which results from the fusion of chromomeres upon the linin thread, enters into the synaptic stage. In accord with LAWSON, Miss WOOLERY has found by measurements, which she records, that there is an enlargement of the nuclear cavity; but, contrary to the former's conclusions, the space occupied by the chromatin material is found by actual measurement, which she also records, to be less. During synapsis there is a shortening and a thickening of the thread to form the uniform spireme which later emerges from the synaptic ball. Unfortunately, there are no drawings to show the thread at the time of greatest contraction. During second contraction the first appearance of the split spireme is recorded, though the double structure spoken of in figs. 11 and 12 may possibly have been an earlier appearance of this condition. In several places considerable emphasis has been placed upon the fact that portions of the spireme are in connection with the nuclear membrane. The question would arise here, whether these were connections of any significance or merely portions of the chromatin that were tardy in movement. Reduction is by means of cross segmentation at the periphery of the radiating loops, as found during second contraction; this act being followed by a side-to-side approximation of the limbs of the loops or of separate portions of the thread, thereby forming the bivalent chromosomes. Evidences of spindle formation do not bear out LAWSON'S theory that the fibers are expressions of lines of tension due to the contraction of the nuclear membrane.

The idea that the resting nucleus is composed of two substances, chromomeres and linin, is still held by this investigator. Before definite conclusions can be drawn concerning the structure of the resting nucleus and the formation of the spireme from the resting condition, a closer series during the early prophases and the late telophase of the last division of the sporogenous tissue must be made. The careful measurements of the nuclear cavity and the chromatin mass at the time of the first contraction cannot fail to show fallacies in the view put forward by LAWSON.—MILDRED NOTHNAGEL.

**Periodicity in mitosis.**—In a paper on embryonal growth and its diurnal period, KARSTEN[14] deals with the periodicity of cell division. He calls attention to the fact that many algae shed zoospores in the early forenoon, and therefore must have undergone cell division during the night; and he cites the work of investigators who have shown positively that *Spirogyra*, *Zygnema*, diatoms, and desmids divide at night, most of them between 9:00 P.M. and midnight. He was not able to find similar records for the higher plants. The work of KELLICOTT[15] on the periodicity of mitosis in *Allium* was overlooked. KARSTEN

[14] KARSTEN, G., Über embryonales Wachstum und seine Tagesperiode. Zeitschr. Botanik **7**:1–34. 1915.

[15] KELLICOTT, W. E., The daily periodicity of cell division and of elongation in the root of *Allium*. Bull. Torr. Bot. Club **31**:529–550. 1904.